FactSheet

National Aeronautics and
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Ames Research Center
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SUPPORTING NASA'S AIRSPACE SYSTEMS PROGRAM

Affect & Aeronautical Decision-Making

Errors in judgment and decision-making are responsible for a large portion of aircraft accidents. Researchers at NASA Ames Research Center and the University of Oregon are collaborating to understand the factors that influence how people make decisions and to develop ways to decrease the likelihood of decision errors.

Experience & Training

People make decisions in different ways. Novices in any domain frequently try to apply an analytical strategy for solving important problems. But when the problems are complex, trying to solve a problem this way can prove overwhelming. With experience, people often develop other decision-making strategies. By taking advantage of their knowledge of their work environment, individuals with experience in a domain can make quick and accurate decisions by recognizing situations and applying solutions that have worked before. But in novel situations, even the experienced decision-maker must turn again to some version of an analytical strategy.

Researchers in this area are studying how experience and training interact with individual differences in temperament and

cognitive capabilities to affect how people approach decisions and the outcomes of those decisions. A goal of this work is to develop ways to shorten the time it takes to develop experience. In aviation, expertise is frequently measured in hours of experience. But much of that experience probably does not contribute to any learning. It may be possible to shorten the time required for pilots and other aviation professionals to develop decision-making expertise by providing them with training exercises designed to provide "virtual experience" that efficiently mimics the natural experiences they would encounter on the job in a much shorter period of time.

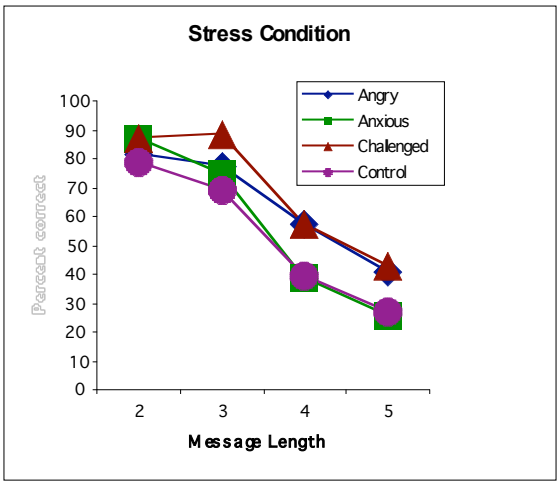
To date over 1,000 pilots have participated in this research. This research

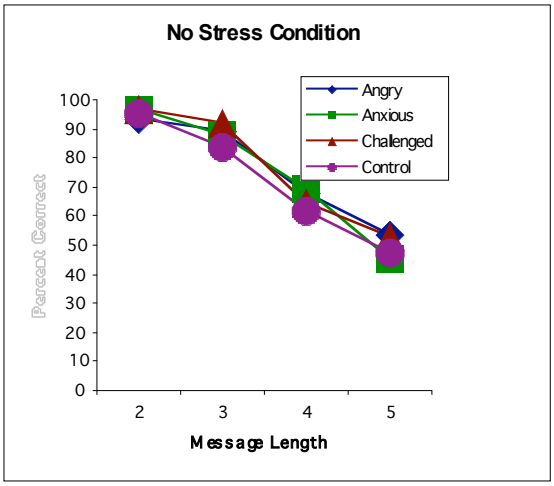
is being conducted using the Internet-based Decision Research System (IDRS) and preliminary findings have been incorporated in the design of NASA In-Flight Icing Training Materials (both the IDRS and the In-Flight Icing training programs are described in other NASA Ames Fact Sheets).

Emotion & Decision-Making

Emotions can help us make good decisions. Frequently, the first indication that there is a problem is a "bad feeling in the gut". Frequently, a good option is recognized because it "feels right." But feelings can also be misleading. Developing ways to tell when feelings are accurate and how to train them is one goal of this project.

In other situations, emotion can substantially interfere with our ability to make good decisions or even to remember clearly. In a series of studies, researchers have demonstrated that when people become anxious, their ability to hold on to





information in working memory is decreased. This effect appears to be limited to fear and anxiety. The negative effects of anxiety on working memory can be reduced in laboratory tasks by encouraging research participants to become angry or feel challenged instead of afraid.

Another way to limit the negative effects of anxiety is to decrease the amount that people must remember in these situations. Pilots flying vectors in response to simulated air traffic control instructions and research participants working on analog tasks did not show any decrease in memory accuracy under anxiety when they were asked to execute three or fewer instructions.

These findings may be useful in the construction of aircraft emergency procedures and controller instructions for dealing with aircraft in emergencies. Researchers are also testing interventions that could be used by pilots and others who must operate under anxiety-provoking conditions without being able to take a break.

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